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| 22879 7590 06/01/2010<br>HEWLETT-PACKARD COMPANY<br>Intellectual Property Administration<br>3404 E. Harmony Road<br>Mail Stop 35<br>FORT COLLINS, CO 80528 |             |                             |                     |                  |
| EXAMINER<br>YUEN, KAN  |             |                             |                     |                  |
| ART UNIT<br>2464   |             | PAPER NUMBER                |                     |                  |
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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### Office Action Summary

**Application No.**

10/633,444

**Applicant(s)**

ROEDER, MICHAEL T.

**Examiner**

KAN YUEN

**Art Unit**

2464

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 04 March 2010.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/CD)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

***Detailed Action***

In view of the Appeal Brief filed on 6/25/2008, PROSECUTION IS HEREBY REOPENED. A new ground of rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

/Ricky Ngo/

Supervisory Patent Examiner, Art Unit 2464

***Response to Arguments***

1. Applicant's arguments, see remark, filed on 3/4/2010, with respect to the rejection(s) of claim(s) 1-23 under 103 Rejection(s) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further

consideration, a new ground(s) of rejection is made in view of Li et al. (Pat No.: 5473599) in view of Espieu et al. (Pub No.: 2003/0200333).

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 17-23 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

For claim 17, the newly added element: "in a first router...., transmitting an address resolution protocol (ARP) request to other ones of the plurality of routers in response to a determination that the packet is to be routed by another one of the plurality of routers; in the other ones of the plurality of routers, receiving the ARP request from the first router" is not supported by the specification. On page 6 of the Appeal Brief, the applicant pointed out the cited section (see page 6, lines 18-26 of the present specification) to support the element, however the cited section does not support the claimed element.

For instance on page 6, lines 18-26 of the present specification, which states "Here, the automated process for load balancing between routers begins when one of the **hosts 102** wants to **send** a packet to a new external destination 110 and **broadcasts 304 an ARP request message** to the LAN 104." and "If the IP address is not found in the ARP cache, an ARP request message may be broadcast to the network". According to the cited phrases, the host sends out the ARP request message instead of the first router sends out the ARP request message to the plurality of routers.

In addition, on page 7, lines 24-25, which states "The process loops back and continues as other **ARP requests are broadcast 304 from hosts 102** wanting to send out packets.", which also indicates the host sends (broadcasts) ARP requests to the routers as opposed to the router sends out the ARP request message to the plurality of routers. Thus, the claimed element is not supported by the present specification.

Claim 23 is rejected similar to claim 17.

#### ***Claim Rejections - 35 USC § 103***

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 6, 7, 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (Pat No.: 5473599) in view of Espieu et al. (Pub No.: 2003/0200333).

**Regarding claim 1**, Li et al. disclosed the method of load balancing between a plurality of routers by automated resetting of gateways, the method comprising:

receiving a packet at a first router from a source host to be forwarded to a destination host (Li et al. see column 6, lines 27-40, fig. 2b). A network segment 118 includes host H, a group of routers (R1-R3) and virtual router R4. Host H is connected to routers R1-R3 via cable 120 and bi-directional line 74 for data transmission;

applying an algorithm at the first router to select a second router to be a next gateway for the source host for packets destined to the destination host in response to a determination that the packet is to be routed by another one of the plurality of routers (Li et al. column 16, lines 10-25). When the active router (the first router) receives a packet and decides that the optimal route is through the standby router (second router), the active router could send ICMP redirect message to the host. The decision to select the second router implied that a decision algorithm/method was performed by the active router;

sending an ICMP redirect message from the first router to the source host to reset a default gateway of the source host to be the second router for packets destined to the destination host (Li et al. column 16, lines 10-25). By sending the ICMP redirect message from the active router, it indicates to the host to use the standby router, and the host would then issue an ARP request for the standby router's primary address. Thereafter the host would route packets through the standby router.

However, Li et al. does not explicitly disclose the features for identifying a current load on the first router; determining whether the packet is to be routed by another one of the plurality of routers based upon the identified current load of the first router.

Espieu et al. from the same or similar fields of endeavor disclosed the features for identifying a current load on the first router; determining whether the packet is to be routed by another one of the plurality of routers based upon the identified current load of the first router (Espieu et al. see paragraphs 0009, 0018, fig. 2). Each router continually examines its own load. Assuming that the workload of router 12 (first router) becomes high than a predetermined high threshold, a lower priority is assigned to one of the group of servers, for instance group 18, thus transferring the flow of data to router 14 (another router), the priority of which is higher than the priority of router 12 for the group 18. If the load of router 12 again becomes high than the predetermine high threshold, the priority of router 12 is replaced by a lower priority for the second group of servers 20, so that the second group of servers 20 transfers its flow of data to router 14;

Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the router as taught by Li et al. to implement the

functionality of router 12 as taught by Li et al. Such functionality includes automatically and periodically examining the load of the router and assigning thereto a new priority for at least a group of servers lower than the priorities associated with all routers if the load becomes higher than a predetermined value and replacing priority values. The motivation for using the feature being that it improves transmission reliability by distributing the extra load to other less congested routers.

**Regarding claim 6**, Li et al. disclosed the feature of wherein the algorithm is load based, and further comprising communicating load levels amongst the plurality of routers (Li et al. see column 8, lines 45-67, column 9, lines 1-42).

**Claim 7** is rejected similar to claim 1.

**Regarding claim 13**, Li et al. disclosed the feature wherein the apparatus is configured to communicate load levels to and receive load levels from other routing apparatus, and wherein the selection module applies a load-based algorithm (Li et al. see column 8, lines 45-67, column 9, lines 1-42).

**Regarding claim 14**, Li et al. disclosed the feature wherein the load-based algorithm comprises a weighted hash algorithm (Li et al. see column 8, lines 45-67, column 9, lines 1-42). In the event that two routers having the same priority are seeking the same status, the primary IP addresses of these routers are compared and the router having the higher IP address is selected, Wherein the IP address is the weighted hash algorithm.

**Regarding claim 15 and 16**, although Li et al. does not explicitly disclosed wherein the selection module applies the load based algorithm comprises weighted



round robin, pseudo-random algorithms, however since the weighted hash algorithm can be perform therefore the other similar types of algorithms can also be perform in similar manner.

7. Claims 2, 3, 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (Pat No.: 5473599) and Espieu et al. (Pub No.: 2003/0200333) as applied to claim 1 above, and further in view of (Request for Comments) RFC 1256 S. Deering 1991.

**Regarding claims 2 and 8**, Li et al. and Espieu et al. both did not explicitly disclose the feature wherein the algorithm comprises a pseudo-random algorithm.

Deering from the same or similar fields of endeavor disclosed feature wherein the algorithm comprises a pseudo-random algorithm (Deering page 10).

Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention to use the feature as taught by Deering in the network of Li et al. and Espieu et al. The motivation for using the feature being that it provides security in the network.

**Regarding claims 3, 9 and 10**, although Deering does not explicitly disclose the round robin type algorithm or other type of similar algorithms, however since the pseudo-random algorithm can be perform therefore the other similar types of algorithms can also be perform in similar manner.

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (Pat No.: 5473599) and Espieu et al. (Pub No.: 2003/0200333) as applied to claim 1 above, and further in view of (Request for Comments) RFC 792 J. Postel 1981.

**Regarding claim 4**, Li et al. and Espieu et al. both did not explicitly disclose the feature wherein the algorithm comprises a hash function, wherein an output of the hash function returns an index of a router to be used to route subsequent packets with a same hash value. Postel from the same or similar fields of endeavor disclosed the feature wherein the algorithm comprises a hash function, wherein an output of the hash function returns an index of a router to be used to route subsequent packets with a same hash value (Postel page 13). The gateway, G1, checks its routing table and obtains (returns) the address of the next gateway, G2. The redirect message advises the host to send its traffic for networks X directly to gateway G2.

Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention to use the feature as taught by Deering in the network of Li et al. and Espieu et al. The motivation for using the feature being that it improves transmission efficiency.

9. Claims 5, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al. (Pat No.: 5473599), Espieu et al. (Pub No.: 2003/0200333) and (Request

for Comments) RFC 792 J. Postel 1981 as applied to claim 4 above, and further in view of Wiryaman et al. (Pat No.: 7010611).

**Regarding claim 5**, Li et al. Espieu et al. and Postel all did not explicitly disclose the feature wherein the hash function is a function of any combination of the IP addresses of the destination and source hosts of the packet.

Wiryaman et al. from the same or similar fields of endeavor disclosed the feature wherein the hash function is a function of any combination of the IP addresses of the destination and source hosts of the packet (Wiryaman et al. column 3, lines 20-30). Thus, it would have been obvious to the person of ordinary skill in the art at the time of the invention to use the feature as taught by Wiryaman et al. in the network of Li et al. Espieu et al. and Postel. The motivation for using the feature being that it provides user friendliness for packet classification.

**Regarding claim 11**, Wiryaman et al. disclosed the feature wherein the hash function is a function of the source IP address (Wiryaman et al. column 3, lines 20-30).

**Regarding claim 12**, Wiryaman et al. disclosed the feature wherein the hash function is a function of a combination of the source and destination IP addresses (Wiryaman et al. column 3, lines 20-30).

10. Claims 17, 18 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Datta et al. (Pat No.: 6295276) in view of Bhaskaran (Pat No.: 5963540).

**For claim 23**, Datta et al. disclosed the system of load balancing between a plurality of routers involving automated selection of a router to respond to an ARP request, the system comprising:

in each of the plurality of routers (fig. 3, routers 110);

means for receiving a packet from a requesting host for forwarding via a network (see column 7, lines 20-30, fig. 3). Data packet is being sent by a first node 306 to a second node 330. The data packet has a physical address corresponding to the source node 306 and also has an IP address corresponding to the destination node 330;

means for identifying a current load of the plurality of routers;

means for determining whether the packet is to be routed by another one of the plurality of routers in response to the identified current load (Datta et al. see column 15, lines 15-35). The load information indicator 410 on which the load balancing algorithm operates can be acquired. Inquiry packets may also be sent by the controller 202 to individual routers 110 to obtain information about current load. Thus the current load indicator implies that when one of the routers 110 is currently overloaded, the router selector 406 of the controller may select different router 110 to route the packets. The controller 202 and its components may each be implemented on one or more of the nodes 102 and routers 110 (see column 13, lines 57-67). Thus, each router 110 may comprise the functionality of the controller 202;

means for receiving the ARP request from network client 106 (see column 15, lines 65-67). At least one network client (requesting host) which generates an ARP request to which the ARP responder 412 provides a response;

means for performing the automated selection of the router to respond to the ARP request by applying an algorithm at each of the other ones of the plurality of routers to determine which single router is to respond to the ARP request (see column 15, lines 15-45, fig. 4, router selector 406, ARP responder 412). The router selecting may be implemented using the router selector 406 of the controller 202. The selection may be made in view of historic selection data 408 or in view of router load information 410. Since the selection is done by a router/controller (processor), thus it is considered to be automatic. The ARP responder 412 provides responses to ARP requests that contain the IP address of an identified router 110, each response specifying the physical address of an identified router 110 which was selected by the router selector 406; and

means for sending an ARP reply from the selected router to the requesting host (see column 17, lines 1-15, fig. 5, ARP responder 412). The ARP responding may be performed using an ARP responder 412.

However, Datta et al. did not explicitly disclose the means for transmitting an address resolution protocol (ARP) request to other ones of the plurality of routers in response to a determination that the packet is to be routed by another one of the plurality of routers; and means for receiving the ARP request from the other ones of the plurality of routers an address.

Bhaskaran from the same or similar fields of endeavor disclosed the means for transmitting an address resolution protocol (ARP) request to other ones of the plurality of routers in response to a determination that the packet is to be routed by another one of the plurality of routers; and means for receiving the ARP request from the other ones

of the plurality of routers an address (Bhaskaran see column 2, lines 64-67, column 3, lines 1-10, and column 4, lines 50-67, column 5, lines 1-10). Flowswitch 302 monitors the status of routers 202 and 104 by monitoring the ICMP RDP advertisements sent out by routers 202 and 104 periodically. When a router fails (determinates that the packet should be routed by other routers), the failed router will no longer send out these advertisements, and therefore the router is identified as failure. Thereafter, the flowswitch continues detects if the failed router has recovered when the router correctly responds to a user-configured predetermined number of consecutive ARP requests sent by the flowswitch. Thus, the flowswitch knows which router is functional and which is non-functional by monitoring the status (current load) of the routers;

When the servers eventually send ARP requests to the failed router, the switch circuit (flowswitch) responds to the ARP request with the MAC address of a functional (optimal) router instead of the address MAC OF the failed router. The subsequent outbound traffic from the servers will now be automatically directed to the functional router. The load towards the routers is balanced by maintaining a list of server that are actively issuing ARP requests, and allocating router MAC address based on round robin fashion. Thus, the server knows the load information of the routers, and issue ARP requests accordingly. Since the ARP is well known in the art, it is obvious to a person of ordinary skill in the art at the time of the invention to realize that the routers, switches, servers or host are able to inter-transmit and receive ARP requests to and from each other.

Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the routers as taught by Datta et al. and to implement the routers and the flowswitch as taught by Bhaskaran in the network of Datta et al. for load balancing. The motivation for using the feature as taught by Bhaskaran in the network of Datta et al. being that it simplifies the routing configuration of the servers and the hosts.

**Claim 17** is rejected similar to claim 23.

**Regarding claim 18**, Datta et al. disclosed the feature for forwarding a packet from the source IP address to the destination IP address (Datta et al. see column 1, lines 25-35).

**Regarding claim 21**, Datta et al. disclosed the feature wherein the algorithm determines the responding router using a round robin type selection process (Datta et al. column 7, lines 40-50).

**Regarding claim 22**, Datta et al. disclosed the feature wherein the algorithm is load based, and further comprising communicating load levels amongst the plurality of routers (Datta et al. column 15, lines 1-45).

11. Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Datta et al. (Pat No.: 6295276) in view of Bhaskaran (Pat No.: 5963540) and further in view of Wiryaman et al. (Pat No.: 7010611).

**Regarding claim 19**, Datta et al. and Bhaskaran both did not explicitly disclose the feature wherein the algorithm comprises a hash function. Wiryaman et al. from the

same or similar fields of endeavor disclosed the feature wherein the algorithm comprises a hash function (Wiryaman et al. column 3, lines 20-30).

Thus, it would have been obvious to the person of ordinary skill in the art at the time of the invention to use the feature as taught by Wiryaman et al. in the network of Datta et al. and Bhaskaran. The motivation for using the feature being that it provides user friendliness for packet classification.

**Regarding claim 20**, Wiryaman et al. disclosed the feature wherein the hash function is a function of the source and destination IP addresses (Wiryaman et al. column 3, lines 20-30).

***Examiner's Note:***

Examiner has cited particular columns and line numbers in the references applied to the claims above for the convenience of the applicant. Although the specified citations are representative of the teachings of the art and are applied to specific limitations within the individual claim, other passages and figures may apply as well. It is respectfully requested from the applicant in preparing responses, to fully consider the references in entirety as potentially teaching all or part of the claimed invention, as well as the context of the passage as taught by the prior art or disclosed by the Examiner.

In the case of amending the claimed invention, Applicant is respectfully requested to indicate the portion(s) of the specification which dictate(s) the structure relied on for proper interpretation and also to verify and ascertain the metes and bounds of the claimed invention.



***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KAN YUEN whose telephone number is (571)270-1413. The examiner can normally be reached on Monday-Friday 10:00a.m-3:00p.m EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky O. Ngo can be reached on 571-272-3139. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kan Yuen/  
Examiner, Art Unit 2464

/Ricky Ngo/  
Supervisory Patent Examiner, Art  
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